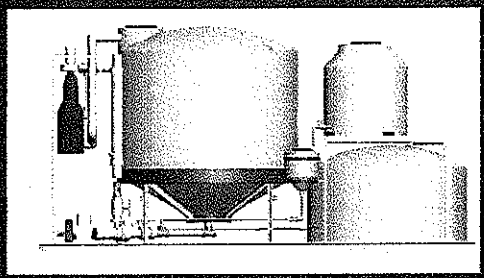
A Look at On-Farm Ethanol Production

Frank Van Kempen
GrassRoots Energy LLC

How the Ethanol Process Works

- Using local crops – typically corn although other feed stocks or waste products (fruit, vegetables, cellulose) can be utilized.
- The crop is ground/milled into a fine powder and added to warm water (90 degrees) to create a slurry or mash.
- Enzymes and yeast are added starting a simultaneous sachrification and fermentation process which creates ethanol while releasing carbon dioxide (CO_2, a co-product that can be marketed in large quantities).
- The ethanol is extracted throughout the fermentation process.
  - Dependent on the use, the proof may be 50% and up.
- The left over mash is wet distillers grains (WDGs) which is a high-value, high-protein livestock feed.

A Look at On-Farm Production



Small Footprint: A 40,000 proof gallon/year unit measures 20' long by 8' wide by 10' tall

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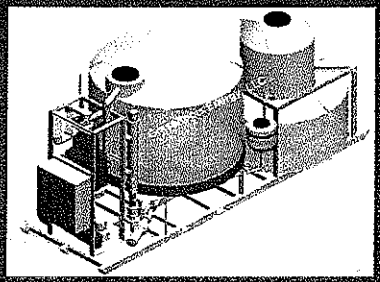


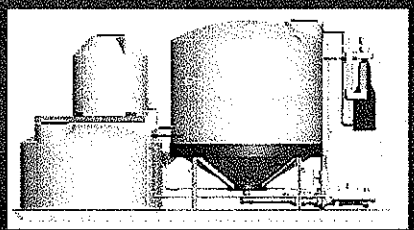
Self-Sustaining Alternative Energy: The 40,000 proof gallon/year system requires electrical service only and operates on 8 kWh of single phase or three phase power. Production use is 1.5 kWh per proof gallon.

Corn Markets

In 2010 approximately:

- 20% of MI corn fed to livestock
- 38% of MI corn shipped out of state
- 27% of MI corn used to make ethanol commercially
- 8% of MI corn carry over for next year
- 7% of MI corn used for miscellaneous purposes

On-Farm Production Co-Products



Food vs. Fuel Debate: The GrassRoots Energy unit addresses the corn/ethanol, food for fuel argument by building protein into the mash during operation and retaining valuable nutrients using low temperature extraction methods instead of high heat distillation. The results are a highly valuable feed product that can be fed to livestock.

Why Not?

- Does it smell bad? No! The only odor emitted is a sweet smell similar to that of baking bread.
- Are they an eyesore? No! Most people will not even be able tell that bio-fuels are being produced on the property unless they have intimate knowledge of the property/facility. A facility that can produce 400,000 proof gallons/year can easily be contained in a 60' x 60' X 14' high building.
- Are they loud? No! Production facilities do not generate any more noise than normal farm equipment.
- Will they pollute the environment? No. In order to be permitted, facilities must meet all state (DEQ) and federal (EPA) environmental regulations. C02 emissions are already part of a 1 year C02 cycle.

Questions or Concerns?

- For more information please contact:
  - Frank Van Kempen
    - (616) 785-1800
    - frankv@vankempenelectric.com